DESCRIPTIONS OF TWO NEW SPECIES OF THE GENUS *CYMBIOLACCA* IREDALE (GASTROPODA: VOLUTIDAE)

By DONALD F. McMICHAEL *

Pl. 6; Text figs. 1-8

Some years ago, I gave an account of the genus *Cymbiolacca* Iredale as it was then known (McMichael, 1959). The genus, which may be placed in the sub-family Cymbiinae of the family Volutidae, occurs along the east coast of Australia, ranging from southern New South Wales to north Queensland. I recognised four species, two of which were polytypic, distributed as follows: *Cymbiolacca complexa complexa* Iredale was considered to occur in New South Wales and south Queensland, as far north as the southern side of Fraser Island. *C. complexa nielseni* McMichael was described as a subspecies found in Hervey Bay, to the north of Fraser Island. *C. pulchra pulchra* Sowerby was considered to be the coastal and deepwater species found in the vicinity of the Keppel Islands and Yeppoon, Queensland, and the island groups offshore, while the coral cay dwelling forms from the Capricorn and Bunker Groups were admitted as a polytopic subspecies, *C. pulchra woolacottae* McMichael. *Cymbiolacca perryi* Ostergaard and Summers from Wistari Reef, Capricorn Group was provisionally allotted full specific rank. *Cymbiolacca wisemani* Brazier was recognised as a northern species, occurring on reefs off Cairns and Townsville, north Queensland.

Subsequent intensive collecting along much of the Queensland coast has led to the discovery of a number of new populations which show much variation. One of these has been named *Cymbiola randalli* Stokes, but the others have as yet not been considered in literature. In the present paper these new populations are discussed and two of them are considered to represent new species which are described below.

Genus *CYMBIOLACCA* Iredale, 1929

Cymbiola (*Cymbiolacca*) Iredale, 1929, *Rec. Aust. Mus.*, 17: 181.

Remarks: I accepted *Cymbiolacca* as a full genus, but Stokes (1961) has suggested that the group does not differ significantly from *Cymbiola*. The generic relationship of *Cymbiola, Aulica* and *Aulicina* requires further consideration, but from all these groups *Cymbiolacca* seems to differ decidedly in the character of its protoconch and in its shell form, both of which are consistent in all known species. The radular teeth of *Cymbiolacca* are quite similar to those of *Aulicina* which is the only one of the three above mentioned groups known so far. I consider that *Cymbiolacca* is a good genus which is clearly separable from related groups, of which *Aulicina* may be regarded as the closest.

Cymbiolacca complexa (Iredale, 1924)

For synonymy, see McMichael, 1959, p. 376.

Remarks: Practically nothing new can be added to the description and range of this species as recorded previously, apart from the radula of the nominate race. Specimens were available from south Queensland, and a radula from one of these, taken off Caloundra, consisted of 85 teeth, very similar in form to those of *C. complexa nielseni* (McMichael, 1959, fig. 1B) and measuring 0.20 mm. maximum width by 0.20 mm. maximum length (text fig. 1); another specimen from off Cape Moreton has a radula with 106 teeth of very large size, 0.21 mm. wide and 0.26

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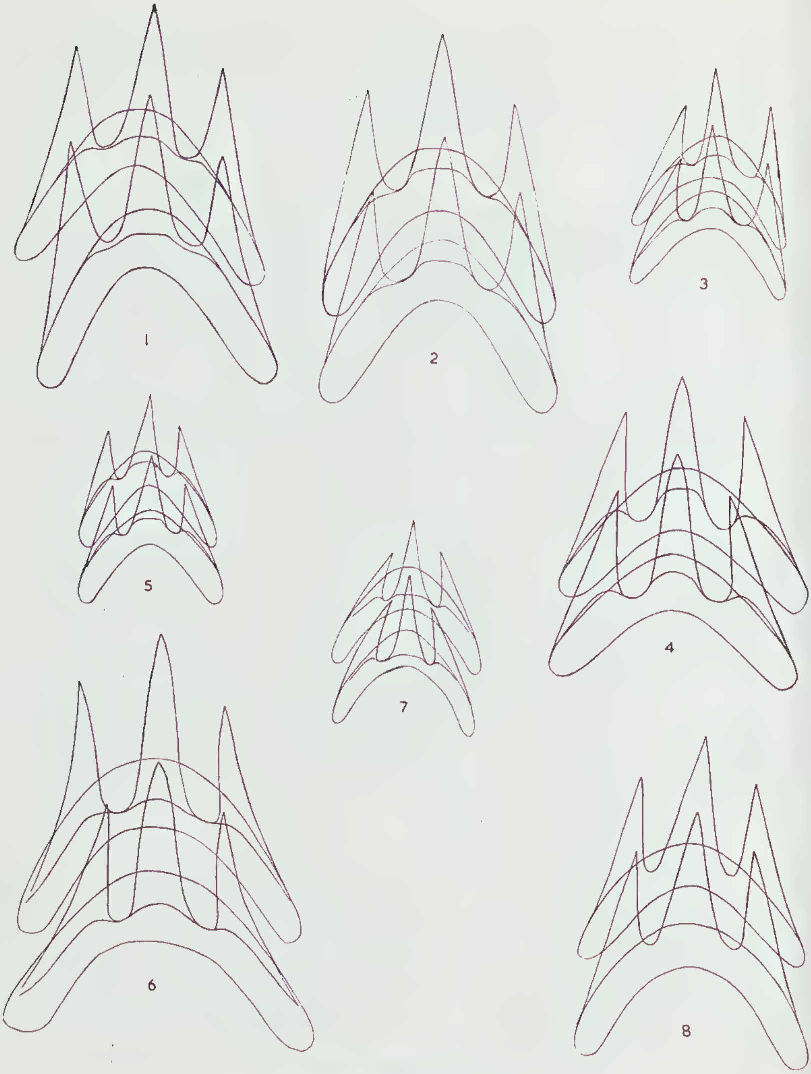
* The Australian Museum, Sydney.



TEXT FIGURES 1-8.

Radular Teeth of *Cymbiolacca* spp.

All teeth are drawn with camera lucida to the same magnification. Actual dimensions are given in the text.

1. *Cymbiolacca complexa complexa* (Iredale). Off Caloundra, Q'ld.
2. *Cymbiolacca complexa nielseni* McMichael. Off Bundaberg, Q'ld.
3. *Cymbiolacca pulchra* (Sowerby). Fitzroy Island, Bunker Group, Q'ld.
4. *Cymbiolacca pulchra* (Sowerby). Swain Reefs, Q'ld.
5. *Cymbiolacca peristicta* n.sp. Swain Reefs, Q'ld.
6. *Cymbiolacca peristicta* n.sp. Swain Reefs, Q'ld.
7. *Cymbiolacca cracenta* n.sp. Off Cape Bowling Green, Q'ld.
8. *Cymbiolacca wisemani* (Brazier). Undine Reef, North of Cairns, Q'ld.

mm. long. Much additional material has been studied, all of which has confirmed the distribution and variation described previously.

The most northerly record for *C. complexa nielseni* is Lady Elliott Island, which lies a few miles north of the mouth of Hervey Bay. It seems that this form is practically confined to Hervey Bay, for shells from near Bustard Head and the Bunker Group coral cays belong to *Cymbiolacca pulchra*. It should be noted that, through a slip of the pen, I spelled the name of the discover of this species Neilsen and named the subspecies *neilseni*, instead of Nielsen and *nielseni*. I consider it correct to alter the spelling under Article 32 of the International Code. An additional radula of this subspecies has been studied; it consists of 67 teeth plus nascents, and the teeth are a little narrower than those of the paratype specimen originally studied. They measure 0.17 mm. broad by 0.20 mm. long and are illustrated in text figure 2.

Cymbiolacca pulchra (Sowerby, 1825)

For synonymy, see McMichael, 1959, p. 378, to which must be added: *Aulicina perryi* Ostergaard and Summers, 1957, *J. Malac. Soc. Aust.*, 1: 30-31.

Remarks: The variation of this species has proved even more complex than previously supposed. A number of new populations have been sampled from coral cays and the deeper waters between the reefs in the Capricorn and Bunker Groups and the Swain Reefs. In nearly every case, each newly discovered population has proved to be subtly different from the others, in some cases recognisable at sight by some particular characteristic of shape, colour and pattern.

Thus Lady Musgrave Island lagoon shells are often pink in hue, with comparatively few, large, dark spots, while Fitzroy Reef shells are slender, light yellow to white in colour. The shell which I referred to this species from Lady Elliott Island (McMichael, 1958, pp. 149-150) has been re-examined and is similar to Lady Musgrave specimens. As Lady Elliott Island specimens collected recently have proved to be *C. complexa nielseni*, I assume that the first mentioned was incorrectly localised. In some parts of the Swain Reefs, the shells resemble those found in deep water in the Capricorn Group and off the Keppel Islands and Yeppoon, but in the vicinity of Hixson Cay, Capre Cay and Gillett Cay (see Gillett and McNeill, 1962, p. 184) in the eastern Swain Reefs, larger shells with prominent shoulder spines and many small spots are found. A population of small shells from deep water off Cape Moreton, Queensland, must be referred to this species, though there is a marked distributional gap between it and the northern populations. It is distinguished by an overall orange-brown coloration, with a short spire and with many small brown spots confined to bands in the normal *pulchra* manner. The shells are all fairly small, not exceeding 50 mm. in maximum length. Among the many shells collected at Lady Musgrave Island are several with an overall pink coloration with large white blotches and very few, if any, dark spots. They thus conform to the characteristics of the shells described as *perryi* from Wistari Reef, Capricorn Group. The latter was previously admitted as a full species, but no further shells of this kind have been found at Wistari Reef despite intensive searching. It is clear from the form of the Lady Musgrave shells that they are simply colour variants of the normal cay population, and similarly *perryi* must now be regarded as merely an uncommon colour variant of the Wistari Reef population. The holotype of *A. perryi* is now in the South Australian Museum, No. D. 14605.

When an attempt is made to apply names to populations varying in this way, the limitations of our trinominal nomenclatural system is revealed. None of these island populations is sufficiently distinctive to

EXPLANATION OF PLATE 6

All figures natural size

Top left: *Lyria cloveriana* n. sp. Holotype, Bernice P. Bishop Museum No. 205555. 50 fm. off Tangalla, southern Ceylon.

Centre top: *Amoria dampieria* Weaver, Holotype, Bernice P. Bishop Museum No. 205554. 28 fm., 5 miles north-west of Steamboat Island, Dampier Archipelago, Western Australia.

Centre bottom: *Amoria dampieria* Weaver, Paratype No. 3, Western Australian Museum No. 16-61. 14 miles off Delambre Island, Dampier Archipelago, Western Australia.

Top right: *Cymbiolacca cracenta* n. sp. Holotype, Australian Museum No. C. 64000. 17-20 fm., 15 miles south-east of Cape Bowling Green, Queensland.

Bottom right: *Cymbiolacca peristicta* n. sp. Holotype, Australian Museum No. C. 64042. 2 fm., Big Sandy Cay, Swain Reefs, Queensland.

Bottom left: *Cymbiolacca wisemani* (Brazier), Australian Museum No. C. 64168. Undine Reef, north of Cairns, Queensland, *"randalli"* form.

Colour block by courtesy Clifton S. Weaver, printing by courtesy K. Gillett.

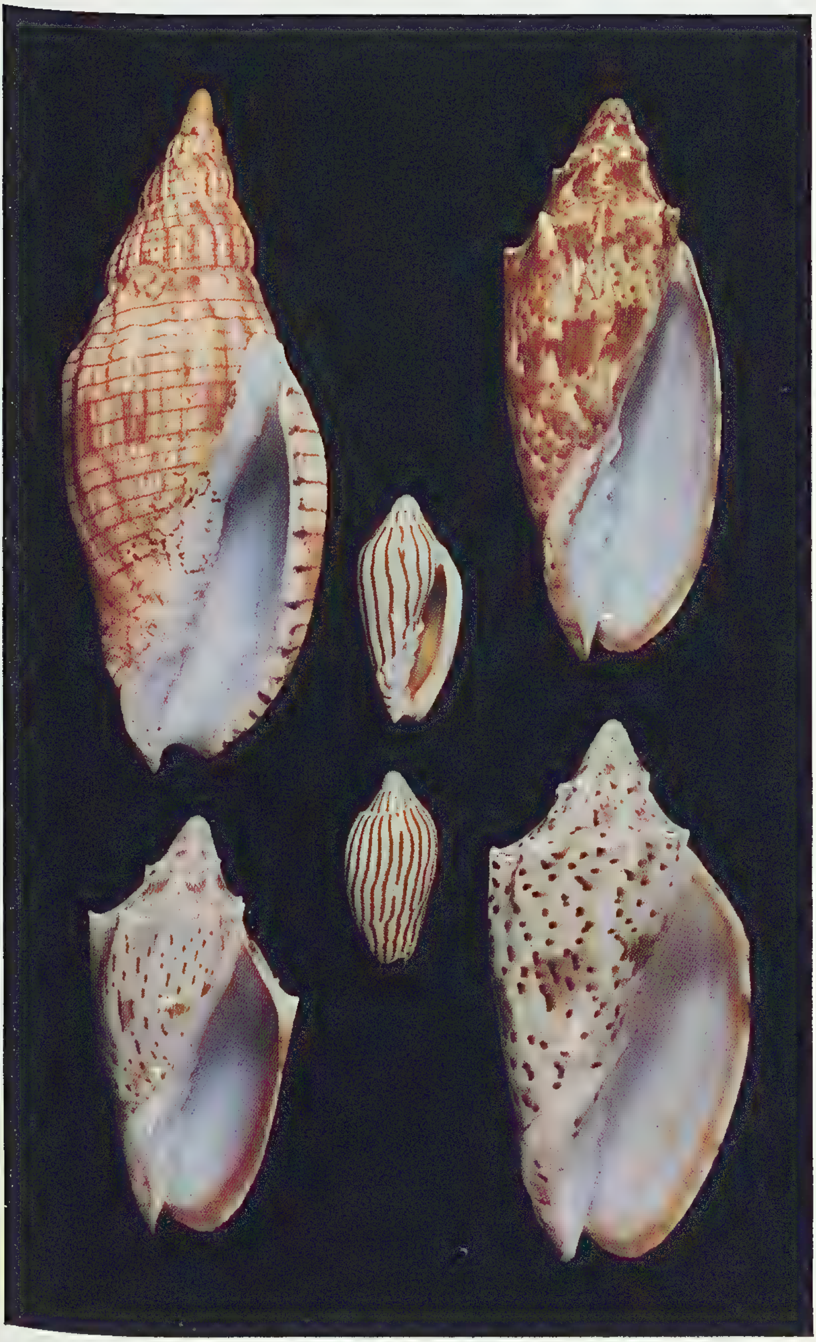


PLATE 6

warrant a sub-specific name and indeed the variation indicates that it is no longer possible to maintain the distinction between the deepwater (and coastal) shells hitherto regarded as *pulchra pulchra* and the coral cay shells which were lumped together under *pulchra woolacottae*. It seems clear that each population is different and is the product of an interaction between its particular genetic constitution (which may be quite distinctive as a result of a high degree of inbreeding) and the local environment in which it is found.

Since writing on this species previously, I have examined the holotype of *Voluta pulchra* Sowerby in the British Museum. On comparing it with the many populations now known for this species, I now consider that it is not, after all, identical with any of the coastal shells studied to date. In fact the shell does not match any of the coastal, deepwater or coral cay populations closely, though it is clearly one of the "pulchra" series and not any other species of *Cymbiolacca*. When considering its identity at first, I concluded that it had been collected by Cook's party and must therefore have been collected at either Bustard Bay or Thirsty Sound, the only two localities within the range of the species which Cook visited. Reconsideration of this has not solved the problem. The shell was described in 1825 and must have been collected at some time prior to that date. The only navigators who visited this part of the Queensland coast before 1825 were Cook, Flinders and King. A study of the voyages of all three shows that none of them visited any of the Bunker or Capricorn Groups from which the shell might have been collected. Flinders anchored in Bustard Bay and near Gatcombe Head; he then spent some time in the vicinity of Port Curtis (where dredging was done) and Keppel Bay and a party visited Hummocky Island, and shells were undoubtedly collected. Iredale (1939, P. 211) claimed that only Cook's shells could have reached England prior to 1820, but Flinders may have brought back some shells. After his ship was wrecked in 1803 on Wreck Reef, he stated that "the naturalist . . . who remained at Port Jackson had put on board only a small part of their collection of specimens," and also that "My little collection in mineralogy and conchology was much defaced, and one-half lost". Presumably the remainder accompanied him to Mauritius, where he was imprisoned from 1803 to 1810. On his release, he made a list of those items which had been seized by the French, but which were not returned to him. These included a cask of rock specimens, but no mention was made of any shells, so that these may have reached England safely in 1810. King collected at Rodd Bay, near Bustard Head, but his collections were described by Gray in an Appendix to King's narrative and King (1826, p.410) stated that "every species brought home" by his Expedition was included in the report, and *Voluta pulchra* was not among them. This leaves only Cook and Flinders as possible sources of the specimen, and in each case, the localities at which collections were made are ones which do not seem to agree with the type specimen.

For the time being, the actual identity of the population from which the type of this species was collected must remain a mystery. Despite this, the specific name seems well established and with the relegation to synonymy of the subspecies name *woolacottae* and the species *perryi*, the way is open for a more realistic description of the variation of the species, using vernacular or geographic descriptive terms. The radula from numerous specimens has been studied and has been found to vary widely, ranging from a small specimen from Fitzroy Island (fig. 3) with 79 teeth measuring 0.12 mm. wide by 0.11 mm. long, to a large specimen from Lady Musgrave Island with 110 teeth measuring 0.29 mm. square while an average sized specimen from the Swain Reefs has 94 teeth plus 10 nascents, measuring 0.18 mm. wide by 0.19 mm. long (fig. 4).

Cymbiolacca peristicta sp. nov.

(Pl. 6, bottom right hand figure)

Description: Shell medium sized, of 6½ whorls, the maximum length about 75 mm.; body whorl broad, shouldered and bearing sharp, outstanding spines which become reduced and cease about 20 mm. behind the outer lip. Colour pinkish white, with numerous very dark brown or black spots of varying size, scattered over the shell, but predominantly beneath the shoulder, black spots with pale pink to brown triangular patches adjacent to them; aperture pink, bordered inside the lip with pale orange. Columellar plaits four, of moderate strength.

Animal with small head and tentacles, prominent eyespots, and rather broad lateral lobes to the head; siphon long, bearing prominent, long appendages of equal size; males with a large club-shaped penis, flattened along its inner surface, originating just posterior to the right lateral lobe.

Radula consisting of 85 teeth plus several nascents, size variable, in one specimen 0.10 mm. broad by 0.11 mm. long (fig. 5) in another 0.23 mm. broad by 0.19 mm. long (fig. 6).

Types and Type Locality: The holotype and one paratype are in the Australian Museum, Sydney, Registered Numbers C. 64042 and C. 64043 respectively. Additional Paratypes are in the National Museum of Victoria (F. 22757), the U.S. National Museum (No. 631775), The Museum of Comparative Zoology, Cambridge, Mass. (No. 208801), and The British Museum (Nat. Hist.).

All known specimens come from one locality, and the majority were from one reef collected by Mr. T. Nielsen, of Yeppoon, Queensland. Mr. Nielsen informs me that the locality is known to fishermen as Big Sandy Cay and is situated at 151° 57′ E. Longitude by 21° 48′ S. Latitude in the western part of the Swain Reefs. All were dredged in about 2 fathoms.

Remarks: The brief description given is sufficient to diagnose the species which otherwise possesses all the features of the genus. It is well characterised by the bold spotting of the shell, which is more prominent than in any other species. The shell was first illustrated on the cover of "Shells of the Seashore" (D. F. McMichael, 1958, Jacaranda Press, Brisbane, Queensland). The relationship of this species is obscure. It seems to be isolated in a small area of the Swain Reefs, with *Cymbiolacca pulchra* its nearest (geographically) relative to the South and East. It differs from that species in possessing black spots all over the shell, and from *Cymbiolacca complexa*, *C. cracenta* and *C. wisemani* in the strength and character of the black spots. In these species the spots are smaller and the ground colour is in each case different from the present species.

Cymbiolacca cracenta sp. nov.

(Pl. 6, top right hand figure)

Description: Shells small to medium sized, maximum length about 70 mm., slender, the maximum width about 30 mm., protoconch of 3½ whorls, orange-pink, with prominent white ribs; adult whorls 3, the body whorl large, spire short; whorls not notably shouldered, but bearing short, sharp, appressed spines; colour brownish red, with a lighter pink ground colour, and broad bands of irregular blotches of deeper reddish brown, generally sprinkled with very fine black spots; aperture white, bordered with orange brown.

Radula consisting of 84 very small teeth, measuring 0.12 mm. square (text figure 7).

Types and Type Locality: Dredged in 17-20 fathoms, 15 miles South-East of Cape Bowling Green (south of Townsville), Queensland. The holotype